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Preliminary Written Notification Report

From: Battelle Columbus Laboratories Decommissioning Project (BCLDP)
Battelle Memorial Institute
NRC License No. SNM-7
Docket 070-00008

Location: Columbus OH - West Jefferson OH Facilities.

Reporting Person: Craig Jensen, RSO Phone 614-424-5170, Fax 614-458-5170

Preliminary Notification: **Possession of Materials in Excess of License Limits**

Facility Status: Facility is in Active Decontamination and Decommissioning.

Note: Preliminary Verbal Briefing provided to Mr. G. Mike McCann, Sr. Inspector, U.S. NRC Region III on June 27, 2002

Report Summary: An irradiated mixed oxide fuel pin (UO₂ - 6.6% PuO) from a Saxton Reactor experiment series was discovered under six foot of water in the sediment layer at the bottom of the Battelle West Jefferson Building JN-1A former Fuel Pool. While Battelle had previously been authorized to possess this pin in the 1970s, sometime subsequent to that, this authorization was removed, presumably on the assumption that it was no longer needed. Virtually all of the materials investigated in the last 15 years of operation of the research hot cell complex (JN-1) were associated with low enrichment commercial reactor fuels and associated activated hardware. A viable pathway for disposal of the fuel rod has been identified.

Background: On June 18, 2002 during routine decommissioning activities in the former Fuel Storage Pool within the Controlled Access Area (CAA) of the JN-1A Hot Cell Building, a general underwater survey revealed two higher activity sources located on the bottom of the pool. One of the sources was visually identified as a long thin cylindrical object inside a basket container (basket source). Exposure measurements greater than 500 R per hour at centerline in contact with the basket container were observed. On June 20 the basket container label was identified as 503-15-2. The other high activity source was identified as a commercial reactor activated fuel grid plate (grid plate).

Access considerations prevented our inspection of the old Fuel Storage Pool and contents until recently. The old Fuel Storage Pool was not frequently used since the mid 1970s. The bottom of this Old Pool does have sediment buildup that prevented easy viewing. The pool has been inaccessible for the last fifteen years due to the presence of very massive experimental apparatus literally sitting on the access hatch until earlier this year.

The removal of the basket source and the grid plate was planned over several days, including incorporation of mock-ups of the operation. The basket source and grid plate were removed from the pool and placed into a shielded transfer container on July 9 and the container was loaded into the High Energy Cell (HEC) on July 10. On July 11 the basket source and the grid plate were removed from the container and the basket source serial number was identified as 503-15-2. The serial number vibro-etched in to the source surface was read with the aid of a magnifying glass. Nominal dimensions were determined to be 40 inches long by less than 0.5 inches in diameter. On June 25, 2002, five (5) additional similar cylindrical objects with lower dose rates were discovered within the pool. These objects were subsequently removed from the pool and serial numbers were identified as: 503-19-1, 503-19-2, 503-20-G, 503-20-H, and 503-21-4.

Materials Involved: Based on the identified serial number for the high dose rate pin that was moved to the HEC, Battelle researched its site records and determined that this basket source came from a Saxton Research Reactor project, and is nominally a uranium dioxide (UO₂)-6.6% plutonium oxide (PuO) mixed oxide (MOX) fuel pin. Its Pu content is 16 grams. Battelle has records that indicate that this pin arrived at Battelle as part of a fuel sub-assembly, the balance of which was shipped to the Savannah River Plant in 1973 for reclamation of plutonium as part of a larger group of Saxton fuel pins. The five other lower dose rate pins are numbered consistently with those from the Saxton Reactor. The first two lower dose rate pins of the group of five pins recently discovered in the former Fuel Pool were identified as being part of low irradiation, 8.8 to 12.5 % enrichment assemblies. These being pins enriched in UO₂ are covered by the existing license, SNM-7. The last three pins of the group of five identified appear to have been subjected to destructive testing due to visible holes in the cladding, and have significantly less mass than the first two pins. Battelle believes that these three are most likely also enriched uranium and are continuing to research this.

Personnel Exposures: During the period when the items were in the Spent Fuel Pool, the area around the pool top was within the CAA and personnel exposures were control according to standard radiological practices. Since these were at the bottom of a fifteen-foot deep pool under water approximately six foot deep there is no credible exposure to the public. Only routine level personnel exposures arose from planned operations associated with the discovery and subsequent removal of the high activity source from the pool to the HEC for further examination. There were no personnel overexposures. Also, there were essentially no exposures to the general public or the environment during recovery operations.

Corrective Actions: Battelle will submit a license amendment to U.S. NRC Region III to increase its possession limits to add irradiated MOX materials. Battelle will continue to research its project records regarding these materials and causal factors for their being in the Storage Pool. At present Battelle is researching why these fuel pins were present in the old Fuel Pool. Any additional substantive facts discovered will be documented for review by NRC inspector at the next routine inspection(s). Because this is a decommissioning project associated with a facility with nearly 30 years of significant operations, it is expected that some anomalous materials may be found. Battelle will continue to manage them as we have in the past and evaluate them for reportability.

Disposition of materials: The experimental nature of the high dose rate pin allows the pin to be managed as TRU waste consistent with DOE Order 435.1. The high dose rate pin has been transferred to the HEC for processing and size reduction as TRU waste. This material is compatible with the current TRU waste streams that are being packaged for transfer to a DOE owned/approved storage/disposal location. This addition will not represent an appreciable increase in the TRU source term or management costs. Refer to Table 1 for additional information regarding the fuel pins and the grid plate.

The following Agencies were notified:

US NRC Region III, Mr. G. Mike McCann

US. DOE Columbus Environmental Management Project Mr. Tom Baillieul, Mgr.

Submitted:  Date: July 18, 2002
Craig Jensen, RSO

cc: Regional Administrator, U.S. NRC Region III
Mr. Mike McCann, U.S. NRC Region III

Objects Summary Table 1

Identification	Radioactive Material	Covered by License	Condition	Disposition
503-15-2	Irradiated MOX pin Hi Dose Rate	No, License Amendment Submitted	Normal	DOE TRU waste stream
503-19-1	Irradiated EU	Yes	Normal	DOE TRU waste stream
503-19-2	Irradiated EU	Yes	Normal	DOE TRU waste stream
503-20-G	Believed same as 503-19-1	Believe so Researching	Destructive testing	DOE TRU waste stream
503-20-H	Believed same as 503-19-1	Believe so Researching	Destructive testing	DOE TRU waste stream
503-21-4	Believed same as 503-19-1	Believe so Researching	Destructive testing	DOE TRU waste stream
Fuel Grid Plate	Activation Hi Dose Rate	Yes	Normal	DOE LLW Waste stream